Distr.
LIMITED
E/ECWA/ID/WG.3/11
13 February 1975
ORIGINAL: ARABIC

ECONOMIC COMMISSION FOR WESTERN ASIA
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Meeting on Selected Branches of the
Food Processing Industry in the Middle East

Beirut, 3-8 March 1975

THE CANNING INDUSTRY "CONSERVA" IN SYRIA[1/]

by

Edmond Hajjar*

---

* Production Director, Productivity Centre, Food Industry Union, Damascus

1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariats of ECWA or UNIDO. This document has been reproduced without formal editing.

Distr.
LIMITED

ID/WG. 201/11
21 January 1975

ORIGINAL: ENGLISH

United Nations Industrial Development Organization

Regional Meeting on the Development of
Selected Branches of the Food Industry
in Selected Countries of the Middle East

Beirut, Lebanon, 2 - 8 March 1975

THE CANNING INDUSTRY " CONSERVA" IN SYRIA[1/]

by

Edmond Hajjar*

* Production Director, Productivity Centre, Food Industry Union, Damascus

1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has been reproduced without formal editing.

id.75-581

CONTENTS

		Page
I	Introduction	4
II	Private Canning Factories	4
III	Public Sector "Conserva" Factories	4
	A. The Modern Company for "Conserva" and The Agricultural Industries	4
	B. The "Conserva" Company of the Syrian Coast (Jebla)	5
IV	The Conserva Companies	5
	A. Raw Materials Used in Production	5
	1. Basic Problems	5
	2. Ways and Means Being Organized to Solve the Problems	6
	3. The Main Varieties of Raw Materials Used in Production in the Conserva	7
	4. Specifications of the Major Primary and Additional Raw Materials Used in Production	7
V	Description of the Public Sector "Conserva" Factories	11
	A. Comprises of:	11
	1. The Modern Company for Conserva and the Agricultural Industries (Al-Ghota, Al-Qaboon, Al-Nzeireeb)	11
	2. The Conserva Company of the Syrian Coast (Jebla)	11
	B. The Modern Company for Conserva and the Agricultural Industries	11
	1. Installations	11
	2. Production	14
VI	The Method of Processing the Main Products of the Conserva Companies	17
	A. Processing of Tomatoes	17
	B. Processing of Peas	17
	C. Processing of Green Beans ("Fool")	18
	D. Processing of Green Okra	18
	E. Production of Truffles	19
	F. Production of Green Beans	19
	G. Production of Ready-Made (Convenience) Foods	19
	H. Production of Pickles	19
	I. The Production of Assorted Jams	20
	J. Production of Compotes	20
	K. Production of Drinks	20
	L. Production of Cans Needed for Packing the Product	20

		Page
VII	Statistical Data	21
VIII	New Products in the Conserva Industry in Syria	21
IX	The Problems Facing the Conserva Companies and Proposals and Recommendations for Overcoming Them	30
	A. The Problems	30
	1. Supply of Raw Materials	30
	2. Production	33
	3. The Organizational Framework and the Administrative Apparatus in the Conserva Factory	34
	4. Marketing of Products and Sales Policy	35
	5. Depots	36
	6. Cost Calculation	36
	7. Proposals and Recommendations	37

I. Introduction

Food processing is one of the most important branches of the Syrian industrial sector. It contributes to the agricultural development by means of consuming a great proportion of its agricultural production, particularly the out of season products.

The food processing industry in this country is not a completely modern one, however, it has a great potential and would play a much more important role in the Syrian economy if it were modernized and expanded. There are canning factories which belong to the Government and others which are privately owned. The former represents a much higher production capacity than the latter.

II Private Canning Factories

The most important are:

The Arab "Conserva" Company within the Damascus city boundaries, (Qaboon area).

The Syrian "Conserva" Company, also within Damascus (Haraista area).

The production capacity of the private sector companies is about 3 - 3.5 tons of tomato pulp daily for which about 20 to 25 tons of fresh tomatoes are needed.

These two factories work about 100 days per year and their annual production of tomato pulp is estimated at 200 - 250 tons. They also produce canned peas, jam and compote, etc., but only in small quantities in comparison with the production of the public sector.

III Public Sector "Conserva" Factories

In Syria there are two "Conserva" companies in the public sector.

A. The Modern Company for "Conserva" and the Agricultural Industries:

Its base is in Damascus and its principal activity is the processing of preserved foods - fruits and vegetables - and convenience foods and drinks, and also the production of cans for the industry. This company also has two cold-stores; one in Qaboon and the other in Mezze. They store foodstuffs belonging to the company itself and also other foodstuffs belonging to various sectors, for a set fee for each variety of preserved goods.

The a/m company comprises of the following five branches:

(i) The "Conserva" branch of Al-Ghota;

(ii) The "Conserva" branch of Al-Qaboon;

(iii) The "Conserva" branch of Al-Mzeireeb;

(iv) The Nezze Cold Storage;

(v) The Al-Qaboon Cold Storage.

B. The "Conserva" Company of the Syrian Coast (Jebla):

It is located at Jebla and includes a "fully-integrated" factory for the "Conserva" industry. It contains one line for the production of tomatoes, peas and other canned goods of various kinds, drinks, etc., another line for the production of cans and other auxiliary parts such as boiling pans and also a laboratory.

The data showed in this study is basically from the Modern Company for "Conserva" and the Agricultural Industries, and the problems mentioned are to a great extent from the operational conditions prevailing in them. With regard to the "Conserva" Company of the Syrian Coast, no quantitative facts can be mentioned since this industry has not yet achieved full operation. It must also be mentioned that the private sector was not fully analysed due to the very small scale of its production.

IV The "Conserva" Companies

The Conserva companies produce tomato pulp and carry out preserving processes for some varieties of vegetables as well as producing some ready-made foods and pickles, especially cucumbers. They also produce jams, compotes and drinks, etc. The number of varieties of items processed is very large and the quantities produced vary a great deal, according to the availability of raw materials and demand for the end product. Tomato products form fifty per cent and more of total production. Jams and drinks are estimated to constitute twenty-five per cent, and the remainder consists of assorted vegetables, convenience foods and drinks.

A. Raw Materials Used in Production:

1. Basic problems:

The "Conserva Companies" face great problems concerning the supply of tomatoes, peas, beans, vegetables and fruits. All the final products, concentrates, juices, jams, compotes and drinks, have strict quality standards, which basically depend on their raw material quality. Although the "companies" buy great quantities of each raw material (in many cases most of the total crops), there are no contracts with the supplies of raw materials. In consequence, the

prices for the raw materials are the ones prevailing in the market (which are higher than the ones normally paid by producers) and the quality varies from one supplier to another. Frequently, the standard of the raw materials is very much under the minimum required to produce quality products. In addition to the quality and the prices which are not adequate, it must be added that the supply timing is also frequently not in accordance with the processing requirements.

Therefore action should be taken to solve the following problems:

- Variation in the price of raw materials during production season, which affects processing costs;
- Variation in the specifications of the raw materials, which affects product quality;
- Irregularity in delivery dates, which affects operating routine in the factory during the season;
- Irregularity in supplying the quantities needed daily, which affects costs and production planning.

2. Ways and Means Being Organized to Solve Problems:

The company started buying tomatoes in 1970 through the Co-operative Federation at a fixed price. However, the required technical specifications of the tomatoes were not defined and this led to the delivery of some quantities in which there were many unripe tomatoes and tomatoes unfit for processing. In some cases these amounted to fifty per cent of the quantities delivered to the factory and this had an adverse effect on the quality of the end product. The above practice was a mistake since if there are prior contracts, it should be possible to obtain good quality tomotoes according to the production requirements needed to obtain end products within the specifications of the standards.

The Federation of Foodstuffs Industries is trying to overcome these difficulties by arranging for prior contracts for the purchasing of the principal raw materials and it is also trying to create fully integrated bodies for supervising purchasing operations for raw materials with the specifications and in the quantities and at specified times. Among these bodies are the following:

- A body supervising the study of the market for the products required so that it should be possible to organise programmes for purchases in the light of this study;

- A body supervising the quality and specifications of the raw materials; it has established a laboratory in most of its 'out-stations' for carring out analyses and experiments relating to the definition of the required specifications;

- A body co-operating with the Centre for Agricultural Experiments of the Ministry of Agriculture, for carrying out field agricultural experiments and circulating the results obtained to the farmers who grow the crops required by the company and helping them to apply the results so as to obtain the best varieties required for processing as well as the best possible return.

3. The Main Varieties of Raw Materials Used in Production in the Conserva:

Tomatoes - green peas - green beans - dried beans - green broad beans (fasoolia) - okra - spinach.

Truffles - vine leaves - cucumber - carrots - olives - potatoes - eggplant - squash - onions.

Apricots - oranges - lemons - mulberry - pomegranate - pears - cherries - quince - apples - figs - peaches - plums.

4. Specifications of the Major Primary and Additional Raw Materials Used in Production:

Tomatoes: These must be completely ripe and red - fresh - free from disease and various insects - non-acid and unbruised - and with no deep cleft marks.

Vegetables: Peas - truffles - green beans - cucumber - vine leaves - okra - green broad beens (fasoolia) - squash - onions - peppers - potatoes - garlic - carrots - coriander - olives - etc.: these should be fresh, and should be of the local variety (baladi), suitable for processing. They should have no diseases or insects, and should be free from blemishes and rot.

Fruits: Apricots - peaches - pears - quince - Syrian (shami) mulberry - figs - pomegranates - oranges - lemons - etc.: these should be fresh and completely ripe, free from diseases and insects and should be free of blemishes and rot.

Metal Boxes: The tin or can should be coated on the inside with a lacquer substance not liable to rust, which is non-toxic and unaffected by acidity.

Labels: These should be of glossy paper, printed in a number of colours, and be of local manufacture.

Bottles: These should be of ordinary glass of local make.

Packing and binding materials: Cardboard boxes of European origin, and manufactured locally.

Adhesive paper: Gummed paper, 7 cm. wide.

Sugar: Refined and also beet sugar, of local make.

Other auxiliary substances: such as spices and olive oil - ghee - meat - etc.: local production and according to the specifications laid down by the Ministry of Supply.

In addition to these primary specifications the Federation of Foodstuffs Industries is at present drawing up regulations in which it lays down the following:

- the technical specifications of the final product;
- production norms for every kind of product.

We believe that this regulation will be ready and tested during 1974 and will be in effect in 1975.

The following table 1 shows the estimates of raw materials production in 1975 according to the 1971 - 1975 plan and the increase over 1970 production.

TABLE 1

Estimates of Raw Material Production in 1975 and Increase over 1970

Production (000 tons)

Product	1970	1975	Increase %
Tomatoes	216	330	52.8
Potatoes	50	70	40
Onions	.50	135	170
Apples	22.5	45.5	120
Citrus	7.3	17.8	144.5
Garlic	3.6	7	92
Hummus	41	65	62
Beans and Peas	14	20	43
Assorted Veg.	180	250	38.8
Olives	128.9	157	22

(please see the next page for the continuation of this table.)

Product	1970	1975	Increase %
Continued:			
Pears	5.5	12.1	119
Apricots	13.1	32.1	145
Peaches	5.3	5.3	-
Plums	3.5	5.3	53
Figs	23.5	58.7	25
Cherries	1	1.8	76

Source: 1971 - 1975 Development Plan (Council of Ministers Decree No. 144/F, 22 July 1971)

To attain the objectives previously mentioned for the production of agricultural crops, the following general methods are used:

- development of resources of land and water;
- mechanisation and modern methods of agriculture;
- improvement of types of crop;
- stimulus and support of agricultural co-operation;
- guaranteeing a minimum price for crops supplied by the institutions of the public sector;
- increasing the efficiency of the marketing bodies and the methods;
- support and development of the state farms;
- promoting scientific research and putting the research results into operation in order to achieve the objectives of development and the Plan;
- completing networks for irrigation and drainage and directing the flow of water in the main channels at appropriate times.

In order to increase yields of agricultural crops, to achieve production targets, to provide adequate quality of raw materials and to improve varieties of agricultural crops, the following steps are being taken:

- generalizing the use of better and homogeneous seeds and removing the constraints limiting the increase of the yields;
- increasing seedings in the state farms and co-operatives and allotting all the necessary acreage for that purpose;
- carrying out agricultural research aimed at increasing productivity;
- increasing the attention given to soil preparation and the provision of the necessary machinery;
- the use of the necessary pesticides to combat weeds;

- improving local varieties in order to increase yields.

Furthermore, in order to attain the above mentioned objective, the Ministry of Agriculture gave priority in its third 5 - Year Plan (1971-5) to the following projects for:

- increasing productivity and reducing losses particularly using adequate pesticides;
- increasing yields by means of increasing the numbers of seedings, including potatoes;
- strengthening the agricultural infra-structure particularly by the establishment of agricultural schools;
- supporting scientific research: specifically aimed at crop protection;
- increasing the planting of trees, promoting the development of vegetable plantations and increasing their yield, the support and development of field crops.

To buy the needed raw materials at a convenient location is fundamental to the proper operation of the processing factories. Special mention should be made of the prices. Adequate prices would contribute to the reduction of production costs and the reduction of the market prices of final products which would lead to an increase in the demand.

As regard to tomatoes, for example, only recently the supply has been assured through the supervision of the Agricultural Co-operative Federation. In the past tomatoes were bought by the purchasing commission of the company, in the markets with prices varying according to supply and demand.

The primary materials needed are determined according to the programme of processing which is in the plan of the company, and in the light of the available supplies in store for this purpose. Therefore, there are mutual interactions between buying operations for primary materials and the processing programme: any shortfall in these materials affects the processing programme and vice-versa. Any defect in the operations of processing in accordance with what has been determined leads to either excessive or inadequate demand for the primary materials and causes fluctuations in prices. The market price fluctuation disturbs the estimates of operational costs, making difficult the management controls.

V Description of the Public Sector "Conserva" Factories

A. As previously mentioned the public sector "Conserva" factories are comprised of:

1. The Modern Company for "Conserva" and the Agricultural Industries (Al-Ghota, Al-Qaboon, Al-Mzeireeb).

2. The "Conserva" Company of the Syrian Coast (Jebla).

The following is the basic information for each factory:

B. The Modern Company for "Conserva" and the Agricultural Industry Factories:

1. Installations:

(a) The "Conserva" Factory, Al-Ghota

This factory comprises of:

- storage operations: these include depots for storing raw and auxiliary materials, as well as spare parts;
- processing operations: these include the main production lines and the processing units, then the sections for industrial services, such as boiling pans and diesel and tin can factory, the mechanical and electrical workshop and the laboratory.

Depots and storage: The depots are divided into a number of sections, each taking in certain materials according to their type and the period of storage. There are stores for manufactured materials, for empty containers, for semi-manufactured materials, and depots for spare parts and machinery. These depots are divided as follows:

- depots for short-term materials: these are used for storing raw materials, such as fruit and vegetables;
- depots for long-term materials: these are used for storing other materials, such as sugar and salt;
- production depots: these are used for storing the completed products;
- depots for machinery and spare parts.

Production lines and industrial units: The industrial operations in production are divided into four stages:

- the stage of preparing raw materials, in which they are cleaned, washed, peeled, etc.; the work on all of these lines is manual except for the tomato and peas lines.

- the processing stage, in which the raw materials are pressed out and cooked, or both. Some of these lines rely on manual or semi-mechanical work, except for the tomato and pea lines;
- the packing stage: in this stage the manufactured materials are packed, by sealing the containers semi-automatically, for all varieties;
- the sterilization and despatch stage: the cans completely manufactured are sterilized in the sterilizers ("Autoclave") then they are cooled in the cooling channel with cold water.

Most of the machine and auxiliary equipment is used for more than one purpose in processing, with the exception of the automatic lines for tomatoes and peas, which are modern and have been recently installed. The old line for tomatoes in the factory has stopped working and is in need of general overhaul.

Industrial services:

Steam: Steam is produced in the Ghota factory by means of three boiling pans with a respective capacity of five, four and two tons of steam per hour.

Electricity: The factory is supplied with electricity by the general network for the Damascus area. Recently the factory has been equipped with a reserve electricity generator with a capacity of 300 K.V.A. in order to run the necessary lines during a power cut for the main network.

Water: The water used for processing and washing comes from wells in the area of the factory.

Laboratory: The factory has a lab equipped to carry out all analyses necessary for processing.

The productive capacity for the Ghota factory: The productive capacity is estimated as follows:

- the new automatic line for tomatoes - 150 tons of tomatoes daily;
- the old automatic tomato line: thirty tons of tomatoes daily;
- the line for peas: 1.5 tons of peas daily;
- various machinery for jams: 2.5 tons of apricots per hour;
- manual workshop for tin cans: 1500 cans per hour.

(b) The Al-Caboon Factory of the " Conserva"

The factory comprises numerous sections which perform a variety of tasks, and these sections may be defined according to the following services:

- storage operations: these include depots for storing primary materials, manufactured materials and spare parts;
- processing operations: these include the main lines for production;
- industrial services which include:

Steam: produced by two boiling pans, the first being new with a capacity of two tons of steam per hour, the second an old one with a capacity of one ton of steam per hour.

Electricity: the factory relies on electricity from the main network and there is a diesel electricity generator recently installed (200 K.V.A.) for use in reserve in the event of a power cut of the main network.

Manual workshop: to produce cans.

Production capacity: This is as follows:

- semi-automatic line for tomatoes with a capacity of twenty-five tons daily;
- a line for peas with a capacity of 1.5 tons per hour;
- machinery for processing apricots with a capacity of 1.5 tons per hour.

(c) The "Conserva" Factory of Al-Mzeireeb

The factory is composed of the following:

- various depots for storing primary materials, manufactured materials, spare parts, etc.;
- lines for production and processing, which include the following:

- an old automatic line for tomatoes with a capacity of 100 tons of tomatoes per twenty-four hours;
- a new automatic line for tomatoes with a capacity of 150 tons of tomatoes per twenty-four hours;
- machinery for processing peas with a capacity of 1.5 tons of peas per hour;
- other various machinery used in processing assorted "Conserva"
- industrial services, which include:

Steam: this is produced by two steam boiling pans, the first with a capacity of five tons per hour, the second of six tons of steam per hour.

Electricity: the factory relies on power from the main network, and there are also two diesel electricity generators, (200 K.V.A. each), used if there should be a power cut.

(d) The "Conserva" Company of the Syrian Coast (Jebla)

This factory was set up recently and experimental production began in the 1973 season, and it includes the following:

- various depots for storage of primary materials, manufactured materials, spare parts, etc.;
- lines for production and processing, including the following:
- an automatic line for tomatoes, with a capacity of 150 tons of tomatoes every twenty-four hours;
- machinery for processing peas with a capacity of two tons of peas per hour;
- machinery for squeezing lemons and oranges with a capacity of two tons per hour;
- other assorted machinery for processing "Conserva", including machinery for mixing, sealing, sterilization, etc.
- industrial services and these include:
- semi-automatic workshop for can, with a capacity of 1500 cans per hour;
- two steam boiling pans with a capacity each of six tons of steam per hour;
- two diesel electricity generators, each with a capacity of 200 K.V.A.

This factory is still in the experimental stage and it is believed it will be in effective operation during the 1974 season and it is expected to carry out its production plan in the light of the availability of primary material at economic prices and in the necessary quantities.

2. Production:

The principal products in the "Conserva" companies are:

TABLE 2

PRODUCTION OF THE "CONSERVA" COMPANIES

Product	Raw end auxiliary materials	Container Size	Distribution of Production	
			Local	Export
			(in percentage)	
Green peas	Large-preserved in water and salt, ratio 2%	1 Kilo net	80	20
Green okra	Medium, preserved in water and salt	"	80	20
Beans	Fasoolia, water and salt	"	55	45
Canned inknar	Lubb in water, 2% salt; lemon hummus 0,3 and 0.	"	10	90
Green Beans	Beans; water, 2% salt lemon hummus	"	75	25
Canned truffles	Brown and white canned truffles. Water proportion 5 and 1% salt	"	20	80
Mixed vegetables	Peas; carrots; potatoes: 2% salt	"	60	40
Canned pickled cucumber	cucumber; water and 4% salt; 5 and 2 hummus with vinegar	"	20	80
Canned pickled carrots	Sliced carrots; 2% salt	"	20	80
Tomato pulp	Density 26/28. Salt 4 - 6%	5; 1; 1/3; 1/6 kilo	30	70
Tomato cauce	"	5; 1; 1/2 kilo	30	70
Tomato pulp	Density 28/30 Salt 2 - 6%	5; 1; 1/2; 1/4 kilo	0	100
" "	Density 36/38 Salt 2 - 6%	"	30	70
" "	Density 36/38 Salt 4 - 6%	"	30	70
" "	Density 38-40 Salt 4-6%	"	30	70

(- means that no information was given. This applies to all the tables.)

TABLE (cont'd)

Product	Raw and auxiliary materials	Container Size	Distribution of Production	
			Local	Export
Tomato pulp	Density 40 - 42. Salt 4 - 6%	5; 1; 2; ½ kilo	30	70
Lemon drink	Sugar concentration 65%	Bottle 850gr. capacity	85	15
" "	Sugar conc. 60%	"	85	15
Mulberry drink	Sugar conc. 65%	"	85	15
Orange juice	Sugar conc. 30%	½ kilo net.		
Pomegranate juice	Sugar conc. 70%	Bottle 850gr. capacity	75	25
Fried beans	beans; olive oil, cor., salt	½ kilo net	30	70
"Fool" Medammas	Egyptian beans; lemon juice; garlic; 2% salt	1; ½ kg.	50	50
Molangi		850; 425; 200gr. net.		
Mixed vegetables	Peas; potatoes; carrots; beans; meat; ghee, water of tomato	½ kg	100	-
Green beans	Beans; meat; ghee; water of tomato	½ kg.	100	-
Peas	Peas; meat; ghee water of tomato	½ kg.	100	-
Potatoes	Potatoes; meat; ghee water of tomato	½ kg.	100	-
Fasoolia: White beans	White beans; meat; ghee; water of tomato	½ kg.	100	-
Olives	Olives; salt % in solution; 10%; lemon	1; ½ kg.	90	10
Kamar edeen	Apricot juice with sugar	Weight: total	100	-
Apricot jam	'Baladi' apricot: 65% sugar concentration	5; 1; ½; kg.	75	25
Cherry jam	Cherries; sugar 70%	1; ½; ½ kg.	-	-
Quince jam	Quince: sugar in solution 65%	5; 1; ½; ½ kg.	75	25
Jam	figs; sugar in solution 65%	5; 1 kg.	100	-

IV The Method of Processing the Main Products of the "Conserva" Companies

The method of processing is similar in all the factories of the "Conserva", and in the following, we summarise the production method for some of the main products:

A. Processing of Tomatoes

The boxes of tomatoes are emptied into the washing basin, which is filled with water, to wash them and to remove dirt from them.

Then the tomatoes are moved from the washing basin on a moving belt, on which they are sorted, to pick out leaves and green tomatoes, and other undesirable materials in the processing.

Then the tomatoes are sliced, squeezed and heated.

Then they are filtered to get rid of seeds and skins and solid foreign bodies.

Then there is the operation of concentration, done continuously.

The modern tomato lines used in the country's factories are of the continuous type, on which the operations of heating, concentration and canning are done automatically. However, the operation of sterilization is performed by introducing the cans into the Autoclave at a temperature of 100° C, and atmospheric pressure for 15 - 20 minutes, and sterilization is followed by cooling the cans in the refrigeration basin, which is filled with cold water which is constantly changed. Below is the sequence of processing operations for tomato pulp:

Fresh tomatoes - washing - sorting - slicing - heating - making juice and purifying - sterilization = seeds and skins as one product and juice with the addition of salt to make another - concentration and/or thickening-up - packing - sealing - sterilization - storing - export.

B. Processing of Peas

Below is the sequence of operations of processing:

The peas must be fresh and not dried up;

The first step is the shelling of the peas, and sorting them by size, large and small;

Then comes the operation of boiling (cooking) at a temperature of 90-95°C, for 3-5 minutes for large peas and for 2-4 minutes for medium size.

Then comes packing in cans after the addition of salt at boiling point,

but the cover must be applied immediately after packing without leaving any chance for the temperature to fall or for air to get in. The proportion of salt added is of the order of 1.7 Kg. for every 100 litres of the water solution added.

Then comes sterilization at a temperature of 115° C. The period of sterilization will vary with the size of the cans and the peas: a one kilo can will be sterilized for about 20 minutes. Nonetheless, the conditions of sterilization must be studied in the light of the type of raw material and of product, which are determined by the previous processing operations and the temperature before sterilization.

C. Processing of Green Beans

Processing is begun immediately after the beans arrive at the factory. The beans should be fresh.

Shelling is the first stage, followed by sorting of the beans by size;

This is followed by boiling (cooking) which lasts for 20-25 minutes, and this is followed by a second boiling operation during sterilization;

Sterilization lasts for 3-5 minutes for ripe, fresh beans and for 8-9 minutes for dried beans, with a temperature of about 90° C.

In addition the sterilization operation will vary according to the variety of the raw material and the manufactured material, and it should be studied according to the circumstances of work, as for the method of processing peas.

D. Production of Green Okra

Below is the sequence of processing operations:

Processing begins as soon as the raw materials arrive at the factory. They should be fresh and not have any dried up pods.

The okra is then sorted so as to get rid of blemishes and foreign bodies unacceptable in processing. At the same time the okra stems are removed.

Then comes washing and cleaning, followed by cooking (boiling).

Then there is a second washing after the boiling to get rid of materials resulting from boiling and after this comes packing and then sealing of the cans and sterilization.

Here again the sterilization will be affected by the type of raw materials and finished product: it is essential to experiment with a few cans to

determine the period and the temperature, as we mentioned in dealing with the method of processing peas and beans.

E. Production of Truffles

The truffles are washed mechanically immediately after delivery and are then cleansed of dirt before they are cooked. After cooking, the damaged truffles are sorted out, and then the remainder are packed, with the addition of a salt solution, after which sterilization is carried out.

F. Production of Green Beans

- trimming the pods and cutting is done manually;
- the beans arewashed after cutting;
- then they are boiled (cooked) and washed once more after the boiling;
- boiling is done at 73-75°C for five minutes (a high temperature and a long boiling period causes high degrees of tenderness and crumbling or disintegration);
- the temperature of the added salty solution should be near boiling and not less than 93-95°C.
- then comes sterilization: a ½ kg. can requires a twelve minute period of sterilization at high temperature which will vary according to the type of raw material.

G. Production of Ready-made (convenience) Foods

- yalangi; stuffed marrows; beans with meat and rice, etc.

Ready-made foods should be prepared daily in view of the difficulty of mechanising all the operations. The most important stages are:

- preparing the vegetables and stuffing;
- the stage of stuffing the vegetables (egg-plant, squash or marrows, vine leaves) with rice, meat and other ingredients added;
- the stage of packing and adding the tomatoes;
- the stage of sterilization and refrigeration;
- and finally the stage of washing the ready-made cans.

H. Production of pickles

The most important of the standards or norms for judging the quality of pickles is to do with the the firmness and flavour of the pickles.

- the cucumber is sorted according to size and then it is washed;
- the washed cucumber is placed in barrels of water to which are added three percent salt and five percent vinegar.

It is essential that the cucumber should be of uniform size for a single can, when they are placed in it when it is filled with the solution heated to 7[illegible]° C.

I. The production of assorted jams

The fruit is prepared and sorted according to size and ripeness; it is striped of seeds and skins according to type of fruit; then the fruit is boiled squeezed and crushed; it has sugar added and is then cooked; the jams are put in cans at a temperature of no less than 95° C; filling when hot, facilitates sterilization.

J. Production of compotes

The most important compotes produced are: apricots, pears, peaches and cherries.

The fruit is sorted by size, variety and ripeness, then the seeds and skins are separated from them, sometimes by use of warm water with a mild alkalic substance to assist in removing skins.

They are packed into cans and then a sugar solution is added at a temperature of not less than 85° C.

The cans filled with the fruit and the solution are heated to expel air, which affects the coloration of the compote.

K. Production of drinks

Among the most important of these are: lemon, orange, and Shami mulberry.

The fruit is sorted, then squeezed and filtered; sugar is then added in appropriate quantities for each fruit, according to varieties and ripeness.

The fruit juice is stirred with sugar until the sugar is completely dissolved.

The fruit juices are put into clean and dry bottles and then the bottles are sealed and sterilized.

L. Production of cans needed for packing the product

The cans are made from thin sheet iron, coated on the inside with a veneer substance which adheres completely to the metal and the inside of the can. This substance is unaffected by acidity, heat or salt solutions.

The most important stages of processing of the cans are:

- the body of the can: sheets of thin sheet iron - cutting out of the body of the can - flattening out - wrapping round - welding the can lid - pressing down - applying the rubber.

Then the lid is placed on the can after it has been filled, and it is sealed mechanically.

VII Statistical Data:

To continue, some information concerning cost, price, production and other aspects of the "Conserva" Companies products are presented. See Tables Three - Eight. (Pages 22 - 29).

VIII New Projects in the "Conserva" Industry in Syria:

A preliminary study is being implemented for the establishment of a new "Conserva" factory in the Idlib area.

The commissions concerned are still engaged in the study of the setting up of the Idlib factory in the light of the following data:

- the need of the Aleppo mohafazat for tomatoes and other vegetables;
- the internal need of the mohafazat for early agricultural produce;
- the requirements of the Jebla "Conserva" factory, estimated at 8,000 tons during the season;
- the impossibility of increasing the cultivated irrigated area because it exceeds the minimum for the agricultural cycle;
- ascertaining the amount of yield per unit of area for crops on irrigated and unirrigated land.

Moreover, at the present time an initial study is being made of establishing a unit for pickling olives in the light of the quantities available and the quantities of the product which are expected to be available for sale. However, the initial study makes plain that the quantities of olives necessary for processing can be transported to an existing factory for pickling, in view of the fact that the cost of equipment in the event of setting up the new unit in an existing "Conserva" factory are less than setting up a new pickling unit, since in the existing factories there are already electricity, steam and land and some of the building and equipment necessary for pickling. In addition is the saving of the cost of land and administration.

Moreover, the commissions are carrying out an economic feasibility study to see if the project is viable and also to compare the alternative of setting up the unit in Idlib, with the other possibility of transporting the crop to the factory Jebla in Damascus.

In the light of the economic feasibility studies of the two above mentioned projects, the necessary decisions will be taken. Here reference must be made to

Table 3

Estimated costs of the main products of the Conserva companies

(Syrian piastras)

Type of product and capacity	Cost of raw materials	Cost of additional materials	Industrial costs	Costs of container and wrapping	Sundry costs Trading profit; consumer discount	Total	Cost to consumer
Tomato pulp Density 36/38 ½ Kg.	49.38	0.75	19.63	34.02	23.05	126.83	120.00
" 1 kg.	101.15	1.50	36.55	36.50	41.26	226.96	235.00
" 5 kg.	545.00	5.00	177.25	134.30	191.45	1053.00	1015.00
Tomato pulp Density 40/42 ½ kg.	56.44	0.75	19.63	34.02	24.16	135.00	135.00
" 1 kg.	115.6	1.50	36.55	46.5	44.47	244.62	245.00
" 5 kg.	622.88	5.00	177.25	134.30	208.75	1148.18	1140.00
Cherry Jam 1kg.	112.36	72.50	43.67	46.50	49.97	325.00	350.00
Pear Jam 1 kg.	122.79	72.50	43.50	46.50	50.11	335.00	365.00
Peach Jam 5 kg.	542.70	362.50	193.50	134.10	207.20	1440 00	1590.00
" " 1 kg.	108.54	72.50	43.30	46.50	34.46	305.00	345.00
Apricot Jam 1kg.	41.30	79.46	43.67	46.50	62.03	272.96	230.00
" " ½kg.	20.73	39.73	23.90	33.77	34.74	152.87	150.00
" " ¼kg.	10.32	19.86	12.65	17.10	17.62	77.55	80.00
" " 5kg.	206.50	397.30	196.52	134.33	274.86	1209.51	1210.00
Compotes							
-Apricot 1 kg.	41.30	31.30	21.50	46.50	41.52	182.72	190.00
-Pear 1 kg.	122.89	29.00	21.50	46.50	35.11	255.00	280.00
-Peach 1 kg.	108.54	29.00	21.50	46.50	34.46	240.00	265.00
Peas 1 kg.	58.69	0.50	20.50	46.50	37.05	163.24	165.00
" ½ kg.	29.34	0.14	11.27	33.77	21.91	96.43	100.00
Green Beans 1kg.	28.06	0.50	20.50	46.40	28.06	123.52	125.00
" " ½kg.	14.03	0.20	11.27	33.71	17.41	76.62	80.00
Artichokes 1 kg.	257.46	1.30	21.83	46.50	95.59	421.88	375.00
Vine leaves 1kg.	28.34	0.50	21.83	64.00	33.96	148.63	150.00
Green, okra 1 kg.	65.91	14.56	21.00	46.50	43.51	191.40	200.00

TABLE 4

Selling prices of the products of the Conserva companies
(Syrian Piastras)

Product	Unit	Consumers' Price
Peas: large	1 kg	165
Peas: medium	1 kg	175
Peas: large	½ kg	100
Peas: medium	½ kg	105
Okra: slim	1 kg	200
Okra: medium	1 kg	190
Green beans	1 kg	125
" "	½ kg	80
Spinach	1 kg	150
Vine leaves	1 kg	150
Artichokes (inkinar)	1 kg	375
Malukhia - leaves	1 kg	225
" - crushed	1 kg	225
Pickled cucumber with vinegar	1 kg	140
Tomato pulp. Density 26/28	1 kg	190
" " " "	½ kg	100
" " " "	5 kg	935
" " Density 30/32	1 kg	215
" " " "	½ kg	115
" " " "	5 kg	1050
" " Density 36/38	1 kg	265
" " " "	½ kg	120
" " " "	5 kg	1315
" " Density 40/42	1 kg	245
" " " "	½ kg	125
" " " "	5 kg	1140
" " Density 36/38 March 1974	1 kg	280
" " " "	5 kg	1345
Apricot Jam (baladi)	1 kg	250
" "	½ kg	150
" "	¼ kg	80
" "	5 kg	1210

TABLE 4 (Cont'd)

Product	Unit	Consumers' Price
Jams		
- Pear	1 kg	365
- Peach	1 kg	345
- "	5 kg	1590
- Cherry	1 kg	350
- Quince	¼ kg	75
- "	½ kg	145
- "	1 kg	265
- "	5 kg	1165
Compotes		
- Pear	1 kg	280
- Peach	1 kg	265
- Apricot	1 kg	190
Rosewater drink	Bottle	175
Pomegranate/molasses	"	270
Fig jam	1 kg	240
" "	5 kg	1075
Fruit salad compote	1 kg	265
Cherry compote	1 kg	265
Jams		
- Apple	1 kg	265
- "	¼ kg	75
- Plum	1 kg	250
Truffles - Best	1 kg	1200
" White	1 kg	1050
Mixed pickles	1 kg	140
Mixed vegetables	½ kg	85
Sliced carrots	1 kg	100
Olives Masaabi	1 kg	250
Green Beans	1 kg	150
Yalangi with oil	½ kg	105
Beans mudammas	1 kg	140
" "	½ kg	85
Lemon drink	Bottle	255
Orange drink	"	255

TABLE 5

Comparative table of production of agricultural products, 1965 - 1971 (in '000's of tons)

Crop	1964	1965	1966	1967	1968	1969	1970	1971
Rice	1.2	2.2	2.2	2.2	7.6	2.5	1.3	0.4
Peas	0.5	12.0	0.9	0.5	0.5	0.3	0.2	0.5
Beans	11.8	12.0	12.5	14.0	7.5	9.2	8.8	1.1
Fasoolia	1.5	1.5	1.5	2.4	3.3	4.4	2.9	3.7
Potatoes	47.7	48.9	40.8	39.7	50.3	47.5	65.3	72.5
Garlic	4.8	6.7	7.2	4.4	2.5	3.6	4.3	5.6
Onions	32.9	33.2	32.3	43.9	50.1	47.9	65.3	90.4
Tomatoes	153.2	135.4	126.0	161.6	183.6	192.0	192.4	248.4
Green peas	1.2	1.9	1.5	1.6	1.4	1.7	2.5	1.5
Green beans (fool')	23.1	37.3	29.7	17.7	16.5	17.9	24.7	25.1
Eggplant	33.2	34.3	35.9	42.5	57.0	49.7	49.3	62.1
Okra	4.3	6.9	4.4	10.3	9.0	8.9	7.0	8.2
Green beans	4.4	5.1	7.4	11.8	14.6	12.2	13.8	18.1
Cucumber	38.8	42.8	45.4	64.0	69.2	74.2	51.1	58.6
Peppers	10.1	9.9	11.4	14.8	14.8	11.0	12.0	18.7
Squash	30.9	34.3	28.4	41.9	35.1	40.3	37.8	39.9
Green lubya	2.8	2.8	2.2	2.8	3.7	3.6	2.4	2.9
Green onions	8.5	9.4	10.1	9.6	10.0	10.5	13.8	12.5
Mixed vegetables	13.2	10.4	7.2	7.6	7.5	9.9	13.3	14.5
Olives	123.0	66.0	117.0	113.0	112.0	129.0	85.0	117.0
Grapes	230.0	206.0	202.0	213.0	213.0	248.0	206.0	209.0
Apricot	29.0	9.0	15.0	22.0	19.0	13.0	22.0	31.0
Apples	24.5	21.3	26.1	27.9	25.5	23.1	17.7	34.2
Pears	5.6	5.4	5.5	6.0	5.7	5.5	5.8	5.8
Plums	3.3	2.4	3.3	7.2	4.0	3.5	4.3	5.5
Peaches	4.4	4.5	4.9	6.3	5.9	5.2	5.0	6.3
Figs	53.0	68.0	54.0	52.0	53.0	50.0	44.0	55.0
Cherries	1.3	1.3	1.7	1.4	1.5	1.0	1.7	1.5
Quince	0.8	0.7	0.9	1.8	1.4	1.1	0.6	0.7
Pomegranate	11.4	10.4	11.9	13.3	15.9	18.0	16.4	24.5
Oranges	3.3	3.7	4.6	4.7	3.0	5.5	4.3	8.9
Lemon	1.1	1.1	1.4	1.2	1.0	1.6	1.6	3.0
Citrus) (others))	1.1	1.3	1.7	1.8	1.1	2.0	1.9	4.2

TABLE 6

Table of annual retail prices for agricultural products

(Syrian Piastras)

	1964	1965	1966	1967	1968	1969	1970	1971
Squash	58	54	48	90	81	76	66	71
Tomatoes	48	55	36	54	51	63	66	28
Eggplant	62	48	40	68	64	58	62	67
Green Beans	71	57	68	83	82	84	81	101
Fasoolia	84	73	108	92	93	95	82	85
Okra	58	65	68	89	75	88	132	146
Peas	75	66	71	100	97	95	90	99
Cucumber	73	59	59	69	65	73	75	98
Malookhia	-	42	24	30	31	-	47	53
Spinach	29	26	24	37	33	35	36	53
Potatoes	34	35	42	48	33	43	42	43
Red onions	31	30	27	33	22	37	40	19
Garlic	26	66	93	81	82	64	68	34
Apples	94	86	88	129	96	87	132	113
Oranges	63	61	73	67	66	75	55	46
Lemons	55	43	61	65	70	70	80	77
Grapes	59	46	55	41	83	74	83	72
Plums	-	63	82	71	75	75	87	93
Apricots	97	94	116	93	67	103	88	79
Figs	-	35	54	38	45	37	47	63
Peaches	63	68	110	81	85	108	91	114
Pears	99	77	129	151	109	131	111	145
Quince	89	146	113	123	92	101	105	110
Cherries	190	224	160	158	171	229	186	194
Pomegranates	-	49	63	82	48	58	60	70
Olives (dhan)	133	140	131	157	150	150	162	225
Green Olives	149	148	149	161	150	150	162	238

TABLE 7

Comparative table for production of the 'Conserva' companies for 1971 -2 -3 and the plan for 1974

Product	1971		%	1972		%	1973		%	1974 Plan
	A	P	E	A	P	E	A	P	E	
Tomato Pulp	2630	3500	75	2278	2500	91	670	8000	8	4000
Peas	440	540	81	603	700	86	328	1000	33	800
Okra	70	15	466	65	30	216	85	40	212	60
Green Fasoolia	79	50	157	88	145	60	100	150	67	75
Spinach	8	15	56	-	15	-	18	15	120	15
Green Beans	86	50	173	150	127	118	162	140	117	100
Vine leaves	50	100	50	87	91	95	37	50	76	40
Halookhia	24	50	48	88	51	172	60	50	120	50
Inkinas	25	100	35	44	117	37	69	70	98	60
Pickled cucumber	66	75	88	45	75	59	12	80	15	40
Mixed pickles	5.5	30	18	-	30	-	1.8	20	10	15
Yalangi	36	150	24	66	153	42	54	160	34	70
Mixed vegetables	42	75	56	31	67	46	60	45	133	40
Fried 'fool'	-	25	-	8.5	8	107	8.4	8	104	200
'Fool' mudammas	60	200	31	75	249	30	250	250	100	160
Truffles	-	50	-	28	50	56	-	30	-	as available
Carrots	0.7	5	15	8.2	-	-	1.4	-	-	-
Green Olives	0.8	20	4	-	45	-	53	80	67	81
Black Olives	1	-	-	9	-	-	-	-	-	-
Mixed vegetables with meat	54	25	218	57	45	128	153	70	220	-
Fasoolia with meat	32	20	162	33	70	47	56	70	81	-
Potatoes with meat	47	15	314	24	67	36	149	70	215	70
Green fasoolia with meat	21	20	108	13	65	20	94	70	135	70
Peas with meat and rice	8	20	41	26	65	40	60	70	86	70
Olives (masabi)	34.5	70	49	40	74	53	27.6	80	35	8

Note: A = Actual
P = Planned
E = % Execution

TABLE 7 (Cont'd)

Product	1971 A	1971 P	1971 % E	1972 A	1972 P	1972 % E	1973 A	1973 P	1973 % E	1974 Plan
Zahsa (?) + meat	-	-	-	-	-	-	85	-	-	According
Eggplant + meat	-	-	-	-	-	-	35	-	-	to
Chicken + potatoes	-	-	-	-	-	-	12	-	-	demand
Jams										
Apricot	846	840	101	882	870	101	1172	1082	108	1200
Quince	166	125	133	169	140	120	112	168	67	150
Cherry	46	100	46	146	130	112	34	150	22	100
Fig	87	100	87	100	179	55	0.9	209	0.5	50
Peach	0.9	7	13	11	2	566	3.7	5.7	66	5
Pear	0.1	-	-	-	-	-	0.7	-	-	-
Apple	2.2	5	45	6.3	5	126	1.8	2.3	96	2
Compotes										
Pear	15	30	49	31	25	124	30	44	68	20
Peach	18.5	30	61	29.3	30	97	15.8	44	34	15
Cherry	6.1	40	15	39.9	40	99	-	54.5	-	25
Apricot	15.9	50	31	15.4	26	59	4.3	27.5	1.8	10
Molasses Pomegranate	7.6	5	152	7.4	7	106	2.9	16.5	19	15
Drinks										
Orange	43	50	86	21	21	100	25	66	60	-
Mulberry	8.5	20	42	1	5	21	1.3	11	12	6
Lemon	40	50	79	-	2	-	29	44	68	20
Tomato	-	10	-	5.7	-	-	-	-	-	15
Rose	5.9	25	23	6.5	7	94	1.2	11	11	6
Qamar ed. deen	13.9	25	56	-	-	-	-	-	-	-
Ice block	218587	320000	68	196000	300000	65	295000	300000	98	30000

TABLE 8

Imports and Exports of some Agricultural Products
1970/71 (in tons)

Product	1970		1971	
	Import	Export	Import	Export
Tomatoes	25191	11691	28295	4877
Onions	616	5121	83	10932
Garlic	-	1220	-	2142
Potatoes	10752	35	14575	7
Fasoolia/lubyabeans	82	720	97	830
Cucumber/pumpkin/ squash	648	3007	1571	2063
Eggplant	3482	31	7046	214
Okra	-	42	2	74
Olives	10	171	-	606
Peas	5	79	57	6
Oranges	61741	3	79917	2
Lemons	14211	7	14900	1
Figs	-	615	-	1187
Fresh grapes	2	4602	-	3359
Apples	8076	646	8481	611
Quince	594	-	419	-
Apricots	473	553	305	1475
Peaches	1097	358	726	399
Plums	137	578	183	995
Cherries	119	2	59	10
Pomegranates	36	152	16	256

the need to try with all means available to develo agricultural crops to cover the maximum productive capacities of the existing factories first of all, and then to think of setting up new factories.

IX The Problems Facing the "Conserva" Companies and Proposals and Recommendations For Overcoming Them:

A. The Problems:

1. Supply of raw materials:

The "Conserva" c mpanies rely on a large number of crops and encounter difficulties in ensuring supplies of some of them, even during the season. Since all of the "Conserva" companies' products have given specifications, these must be observed. Therefore, it is necessary to purchase the raw materials with specifications in order to obtain a final product with the required quality. The raw materials are ensured by the company's purchasing commission without there being prior contracts between it and the merchants. In most cases the merchant does not supply the raw material with the necessary technical specifications for processing and, delivers to the factory the remains of his market business, or he delivers to the factory the fruits and vegetables he can not sell in the market at prices higher than factory prices. However, that is not general practice for all purchases, but we merely assert that this happens in some cases according to the supply and demand on raw materials.

Since 1970, the "Conserva" companies have begun to ensure their raw materials and especially tomatoes and apricots by means of the Agricultural Co-operative Federation and from the state farms at a fixed price, that has been previously agreed upon. But this agreement does not include the necessary specifications for processing which in some cases leads to the delivery of quantities of the raw material with poor characteristics. It has also been observed in some cases that the Agricultural Co-operation Federation does not observe delivery dates and daily amounts in such a way as to fit in with the factory's daily productive capacity. This has an effect on the proper running of the processing operations and their regularity in general. As previously mentioned, ensuring the primary agricultural materials for processing is affected by the following:

- variation in the price of a singe commodity during the season of production, which affects industrial costs;

. . .

- variation in the specifications required for the industry, which affects the quality of production and return;
- irregularity in delivery dates, which affects the factory operating routine;
- irregularity in effecting deliveries in the quantities ordered, either on a daily basis or seasonally, which affects the production plan and the plan for marketing and costs.

For the company not to bind itself by prior contracts, whether with the state farms, or the Agricultural Co-operative Federation, or the merchants, in which are laid down the specifications required, the price and the quantities required to be delivered, daily and in total, is to put at risk the ensuring of the primary product, and it is sometimes compelled to take delivery of unsuitable produce for processing. Moreover, the company may have to ensure its primary produce at prices which fluctuate from day to day in one season for the same item.

The following table exemplifies clearly, the variation in buying prices for some of the principal raw materials in the period 1971 - 1973.

TABLE 9

Raw Materials Price Fluctuations
(Syrian Piastras)

Raw Material	1971	1972	1973
Tomatoes	10-11	8-12	10-20
Fasoolia	45-50	20-80	85-100
Peas	20-30	25-41	35-55
Beans	20-25	16-18	20-26
Apricots (baladi)	45-50	40-62	70-80
Oranges	25-35	30-35	29-33
Apricots (Kilabi)	20-30	20-40	35-65
Pears	85-90	75-85	100-125
Quince	30-38	38-49	45-57
Pomegranate	25-30	25-28	36-38
Cucumber	27-50	40-43	55-60

On the other hand the company is lacking in the integrated machinery for supervising purchasing operations for primary products in the quantities, with the specifications and at the specified times required.

Since tomatoes are among the principal items needed by the "Conserva" companies, there are many difficulties in ensuring this item in the right quantities for processing in spite of the fact that they are guaranteed by the Agricultural Co-operative Federation.

To take the quantities delivered to factories in 1972:

The Ghota Factory

If we take account of the fact that the effective productive capacity of the factory daily is 110 tons, i.e., 77 tons per week, and taking the deliveries to the factory of tomatoes weekly, we find that the Ghota factory during the tomato season worked for one week only at its effective productive capacity (when deliveries came to 830 tons); and that the factory worked for four weeks at about its effective productive capacity, (when deliveries weekly varied between 730 and 760 tons); for one week at about 530 tons; one week at 430 tons; and for the remaining weeks at a mean average of 335 tons of tomatoes. That is to say that at the height of the tomato season in the Damascus region, the factory worked for only four weeks at full productive capacity, apart from there being a shortfall in deliveries at the beginning and end of the season of about 30-50 percent of productive capacity.

As for the Mzeireeb factory, it faced the same difficulties in ensuring supplies of tomatoes. If we consider the theoretical capacity to be 110 tons daily, i.e. 770 tons weekly, taking the same season, 1972 there was one week when deliveries came to about 655 tons, two weeks of of 525 tons, two weeks of about 425 tons and the remaining weeks' deliveries came to between 200 - 300 tons.

The same difficulties are met by the Qaboon factory during the tomato season. If we take the effective production capacities of the "Conserva" factories daily, to be:

	1972	1973
Al-Ghota	150 tons of tomatoes daily	150
Al-Qaboon	25 " " " "	25
Al-Mzeireeb	150 " " " "	250
Total	325 " " " "	425

and if we regard the lines as working at their given capacities for eighty days only then the necessary quantities of tomatoes for processing in the Damascus and Deraa areas will be:

80 x 25 = 29,750 tons,

and if they are run for ninty days the total will be:

90 x 425 = 38,250 tons,

in addition to what is required by the Jebla factory. Here we can see the difficulties and the gravity of the situation in ensuring the raw material for tomatoes to run the factories at full capacity.

2. Production:

In spite of all the developments and improvements made in the "Conserva" factories, whether in ensuring modern equipment and machinery, increasing the numbers of technicians and a trend towards a better method of processing, nonetheless, scientific progress in the "Conserva" industry is still slow without any great improvement to go along with modern scientific development which is continuous in this important foodstuffs industry.

Since the specifications of the raw material vary from day to day and even in the same day, this leads to great difficulties in the processing operations and it is not possible to rely on one fixed processing method. But it is essential for the company's technicians to have a sufficiently high standard of knowledge to deal with production difficulties when they occur and before it is too late. This requires the presence of engineers who are chemists and specialists in the foodstuffs industries, of wide experience in this area, to obviate what is possible of production difficulties in processing.

The ratio of mistakes noticed in the "Conserva" industries decreases from season to season. The following are some of these mistakes:

- variation in colour and density of tomato pulp;
- variation in taste, colour, flavour and proportion of sugar in a given kind of jam;
- variation in the firmness of pickled cucumber, as well as in its acidity and so its taste;
- variation in the firmness of the fruit in compotes, in relation to any given kind;
- variation in colour of peas, and the presence of a variety of sizes in one car.

Therefore, at present, in all the factories of the "Conserva" companies, there is the laboratory, with the necessary equipment for control of production, continuous and precisely, to end production mistakes. Moreover, the production difficulties, as previously stated result from the difficulties which derive from ensuring the raw materials, with the specifications and with the quantities necessary for processing daily, with the lack of the necessary technical experience, the reduction of yield and the increase in wastage in the materials processed. The most important reasons for the loss are:

- the variety of the raw material and its quality;
- the high rate of damage to the raw material during storage and delivery;
- the way in which the workers deal with the raw materials and the methods of handling in the preparatory stages;
- inefficiency of the industrial operations and unsuitability of the processing conditions for them;
- lack of preparation of the raw and auxiliary materials at the right time for processing.

3. The Organizational Framework and the Administrative Apparatus in the "Conserva" Company:

As stated previously, the "Conserva" company is deficient in technical personnel specialized in the "Conserva" industry with the competence and in the numbers necessary for this vital industry, for the effective supervising of all stages of processing, in line with modern scientific development.

In view of the company's being composed of a number of factories - one in Ghota, another in Gaboon and a third in Mzeireeb - and the administrative direction being in Damascus - the proper running of these factories is affected. A way must be found to bring together the Damascus factories (Damascus and Ghota) in one place with the administrative direction in the same building as the factory to facilitate the management of operations (particularly during the seasons, which may require taking immediate action under a number of headings, especially with regard to ensuring the supply of raw materials) and because of the possibility of swiftness of reaction in taking decisions on commercial matters.

The company faces great difficulty in ensuring its specialized administrativeapparatus for several reasons. Among the most important is the difficulty of guaranteeing specialized personnel able to organize and co-ordinate a number of factories widely separated, but linked by means of a singlecentralized administration.

Another difficulty arises from the lack of a cadre on whose numbers the company can depend, the companies having to contract with seasonal workers, who may not have sufficient experience in the particular work of the "Conserva": every year the company has to make agreements with new workers, other than those of the previous season.

Other problems are:

- the low minimum wage, whether for specialist, technical personnel or for production workers;
- lack of co-ordination between the different sections of the one factory and between the different factories of the company in such a way that the programmes for taking delivery of raw materials and their quantities are consistent with numbers of workers on the various production lines;
- the large number of manual operations in some stages of processing;
- the lack of a professional description for all work centres;
- the large number of situations vacant in basic posts and the small number of specialist personnel.

4. Marketing of Products and Sales Policy:

At present the company relies on the consumer establishment for disposing of its produce within the framework of the other products of the public sector. The sales policy was unplanned in relation to every single product. This has brought about an unhealthy situation to the products: the consumer organization has been forced to link disposal of some products with that of others. However, a solution is on the way, since the plan is being studied in the light of the needs of the market for each item.

As for the exporting, this is assured by the General Organization for Foreign Trading in Foodstuffs (Tafco). The marketing operation has also begun to improve, by calculating actual approximate production costs and fixing the selling price to the consumer in the light of these, at the same time keeping the legal profit for the company. Up to now, however, it has been noticed that for some products the selling price to the

consumer has been below production cost. This is in accordance with the state's policy of ensuring the supply of foodstuffs at the lowest possible price.

5. Depots:

The company is deficient, in all its factories, in technical storage warehouses for preserving primary materials of medium-term duration, such as citrus fruits, some fruits and vegetables. Such depots as these are of use also for storing semi-processed products on the production line, in the event of emergencies and when breakdowns occur which entail keeping back these products for a short time during which they may be in a highly delicate state, which may have an effect on their specifications.

6. Cost Calculation:

Up to the present time there is no special section in the "Conserve" companies dealing with cost calculation able to calculate production costs according to modern methods used world-wide. Since purchase of primary materials goes on a daily basis and at varying widely disparate prices, the existence of the real costs would help the trading officials in the company to make sound manoeuvers in buying such materials at prices they consider to be economic prices without having to refer back to other departments, in order get approval for buying at prices higher than the prices planned for. Usually the reply comes back from the departments concerned after the goods have been sold to parties better fitted to act on buying and selling such as merchants and owners of factories in the private sector.

Among the important elements in production costs are the container costs. In spite of the efficiency of the Gaboon can factory in processing, its distance from the Ghota and Mzeireeb factories and the presence of old machinery which still rely on manual work and the lack of co-ordination of its production lines, have led to an increase in production costs for containers of the various sizes. If the Gaboon factory in its entirety were transported to Ghota, it would be possible to reduce total annual costs of the factory. Moreover, its being in the Ghota factory where there is a modern technical workshop for maintenance of machinery might increase its productive efficiency. In addition a tin factory in the Mzeireeb factory must be provided, and this would reduce transport costs and the ratio of damaged tin during transportation.

Furthermore, the technical production difficulties we have previously mentioned, which are the cause of a high waste - ratio of materials in the various stages of processing - inevitably have a share in the rise of the costs of processed materials. In addition to this, there are some materials added in the process of production which it would be possible to dispense with, and some others which it is possible to regulate in quantity, as is the case with salt and sugar if the conditions of the production operations were dealt with.

The cause of the increase of costs is also the obvious increase in the numbers of workers, permanent and seasonal, although the new lines installed recently in the factory are all automatic. The reason for the increase in numbers of workers is the lack of good co-ordination in work in relation to the sections in which there are hand-operated machines.

Below is a table which makes plain the development in the numbers of workers from 1967 - 1973.

Year	Permanent Workers	Seasonal Workers - Average	Total
1967	214	275	489
1968	214	246	460
1969	199	203	402
1970	230	247	477
1971	235	292	527
1972	245	300	545
1973	281	425	706

7. Proposals and Recommendations:

1. Contractual arrangements with the farmers by means of prior contracts, which should be explicit and define prices, specifications and quantities to be delivered, average size of deliveries, delivery dates, containers to be used, and other controlling factors, along the lines of the contracts for sugar beet. The contractual relations to be established should be established in one of the two ways following:

- direct contracting between the company and the farmers with the help of the Agricultural Co-operative Federation and the Co-operative associations.

- making a contract between the company and the Agricultural Co-operative Federation (ACF), and in this case, the latter must ratify individual contracts with the farmers and the Co-operative Associations.

In both cases the " Conserva" company, in order to guarantee fulfilling of contracts, must guarantee a cash advance on account of the crop at an average rate of twenty percent, at least of the estimated value of the quantities contracted for, so that contracts such as these guarantee the mutual rights of both parties.

2. Payment of the value of the crop delivered within the shortest possible time, not to exceed a week from each delivery of the crop.

3. Delivery to be taken at the factories of the "Conserva" company by a commission of receipt, including representatives of the company and the ACF, as well as of the farmers, possessing the necessary skill and experience.

Should there be any dispute over delivery and receipt which the commission is unable to resolve, the subject should be put before an arbitration commission, previously appointed, in the mohafazats to which the factories belong, comprising representatives of the Ministry of Agriculture and Agricultural Reform and the Federation of Foodstuffs Industries and the Central ACF.

4. In view of the shortage of primary material for some of the "Conserva" industries, in the event of the movement of a quantity of tomatoes or other items from Damascus to Deraaa, or vice versa, or from Damascus to Jebla, or vice versa, at the wish of the company, and for its benefit, the company will bear the cost of transport.

5. Fundamental study of the subject of containers and finding solutions for the use of the best types of container, provided this is done by consultation between the parties concerned and that this condition is included in the contract.

6. Attention to be paid to the subject of loading and unloading and the institution of controlling factors for this operation.

7. Drawing up a stage by stage programme with the Ministry of Agriculture to ensure adequate agricultural primary products to operate the "Conserva" factories at full productive capacity.

8. The interference of the suppliers of raw material should end at the delivery time. No interference should be permitted after that act, since they would disturb the whole factory operations from the reception of raw materials, their processing and the delivery of final products.

9. Working towards organization of delivery between producers according to a programme which ensures giving every farmer the chance to deliver his crop according to the acreage sown and the quantity contracted for, so that the total of daily deliveries does not exceed the defined productive capacity of the factories.

10. The farmer should sort the tomatoes, vegetables and fruit before delivery to the factory, so that deliveries unsuitable for processing will be rejected and random samples will be taken on receipt (three containers from each load, at least), while an estimate will be made of the ratio of produce which does not comply with the required specifications. If there is any contravention of the specifications the weight will be discounted, but the proportion of such contravention should not exceed ten percent. If it does, the whole quantity will be rejected, whatever its source.

11. In order to provide the largest possible quantity of primary materials and in view of the amount of study such a task requires, we consider it necessary to strengthen the company and the Federation with the following bodies:

- a body to supervise study of the market for the products required, so that it is possible to organize buying in the light of the study;
- a body to supervise type and specifications of the primary materials, with the help of a complete laboratory with equipment and personnel exclusively assigned to analyses, experiments and tests relating to the definition of the required specifications;
- a body to co-operate with the local agricultural and scientific departments to conduct field agricultural experiments and circulate the results obtained to the farmers who grow the crops required by the company and help them to implement the findings so as to get the varieties needed for processing.

12. Carrying out the necessary analyses of the primary materials and the materials in course of production and the processed materials in order to discover their characteristics and how far they measure up to standard specifications, and consequently directing processing operations.

13. Equipping each factory with a refrigerating room to keep some of the fresh primary materials for the time of processing, and also to store some of the half-processed materials, to complete processing when

work is slack in the factory or to store them in the event of a break-down on the production lines, so that these products should not be affected in their more delicate characterizations.

14. In the event of there being supplies of the primary materials in sufficient quantities, we consider it necessary to run the production lines for three shifts per day and to spread the labour force over these shifts, so that work will be uninterrupted in processing fresh primary materials in the shortest possible time after taking delivery. In this way it will be possible to reduce wastage, damage and overtime payments.

15. Proper exploitation of the machinery in the factory and repair of broken-down machinery, in order to ensure the running of automatic equipment and to reduce reliance on manual labour.

16. Development of the laboratories in the factories and equipping them with the personnel and equipment necessary for the analyses required and for the carrying out of experiments for the development of production.

17. Training of those working on the lines after they have been distributed in such a way as to guarantee adequate numbers of specialists at every stage, at the same time intensifying control and continuous effective supervision.

18. Strengthening the factories with a workshop for maintenance and a well organized store for spare parts, with specialist personnel to carry out proper maintenance at regular times and to repair sudden faults rapidly during the season.

19. To try to keep seasonal workers on continuously, so as to preserve the experience acquired.

20. So organize the depots as to facilitate movement through them and the withdrawal of the required materials at all times and under all circumstances.

21. Placing boards made of wood or any other material resistant to humidity in the store for primary materials used for completing processing, such as sugar, in order to prevent the seepage of humidity from the cellar of the store to them.

22. Improving methods of producing cans and using the modern automatic machinery available to the company so that it will work automatically with the aim of increasing the productivity of the can factory.

23. Carrying out an economic study of the use of cans made from pressed out thin sheet metal.

24. Mechanization of transport and processing operations as far as possible, and renovation of old machinery.

25. Laying down production norms for every product and working continuously to improve them in order to achieve the ideal norms.

26. Ensuring specialized, educated technical cadres from top to bottom of the organization.

27. Increasing the numbers of those sent abroad for technical specialization in the "Conserva" industry.

28. Sending technical missions abroad for fact finding tours in order to exchange experience and develop the existing industry.

29. Strengtheningand reinforcing the technical and productive apparatuses in the Federation of Foodstuffs Industries, so that it can play its leadership role in supervision and direction.

30. The need to provide the necessary spare parts in the necessary quantities at the right times, in order to face any breakdown which might affect production, yield, wastage and return, etc.

31. The preparation of an "establishment table" for every factory whose setting up is decided on, before it is set up, and training part of its main technical personnel in the country which exports the machinery and equipment. Although this has not been done for the Mzeireeb and Jebla factories, nonetheless, we consider it to be essential to send some technical personnel from among the employees at Jebla and Mzeireeb, to the countries which delivered the machinery of the two factories. These employees should be trained in operating, maintaining and working properly on the machinery and equipment as well as on developing it. Until these technical personnel are sent abroad, we consider that the United Nations and the Arab League and other concerned world bodies should be asked to send some of their specialists and experts to Syria to work on the development of personnel of the "Conserva" industry and the training of technicians locally, as well as to work on a detailed and precise study of the situation of these companies, in order to learn of their problems and put forward recommendations for overcoming them.

32. The need for the company to make all possible efforts to implement its exploitation plan for 1974 completely, since the projects mentioned in it have a great influence on the development of production and the reduction of waste.

33. The study of the possibility of moving the Gaboon factory and the central administrative machinery to the Ghota factory, which will assist in reducing the proportion of technical personnel and facilitate the running of the two factories together, by the unified administration.

34. The need for implementing a system for calculating costs so that those in the company responsible may by means of this system control the various operations with the necessary supervision.

35. Setting up a library in every factory equipped with all scientific books dealing with the "Conserva" industry.

36. Providing health and industrial safety conditions for the workers to protect them from disease and accidents.

37. Finding a suitable solution for the problem of incapacitated and aged, and guaranteeing their rights.

38. Development of relations between the administration and the workers for the sake of increasing productivity, in such a way as to bring about real co-operation between the two sides on the basis of improving the working conditions, raising the productive capacity and increasing the return on labour and the maintenance of the machinery.

39. Drawing up an internal routine, standard and comprehensive for all the factories.

40. Drawing up a professional description of all the positions in the factories and reviewing as far as possible, the minimum wage, in the light of this description and in conjunction with the Ministry of Social Affairs and Labour.

41. Acceleration in implementing the system of incentives for production.

42. Leaving freedom of manoeuvre to the individual establishment within the framework of the production plan previously agreed on, and making this plan have the force of law which must be carried out. This guarantees individual initiative and opportunities for the factory which is being impeded by routine.

43. To try to increase exports of agricultural products by means of a fully integrated plan, which should link up agricultural production and industrial production on the one hand, and between the demands of local consumption and export possibilities on the other.

44. The need to do sufficient propaganda and advertizing work in order to make known our products abroad, by means of wide-spread advertising campaigns for Syrian products in markets abroad.

Distr.
LIMITED

E/ECWA/ID/WG.3/12
13 February 1975

ORIGINAL: ENGLISH

ECONOMIC COMMISSION FOR WESTERN ASIA
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Meeting on Selected Branches of the
Food Processing Industry in the Middle East

Beirut, 3-8 March 1975

DEVELOPMENT OF THE FOOD INDUSTRY IN THE MIDDLE EAST COUNTRIES[1/]

prepared by
the Secretariat of UNIDO

1/ This document has been reproduced without formal editing.

United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG. 201/13
13 February 1975

ORIGINAL: ENGLISH

Regional Meeting on the Development of
Selected Branches of the Food Industry
in Selected Countries of the Middle East

Beirut, Lebanon, 2-8 March 1975

DEVELOPMENT OF THE FOOD INDUSTRY IN THE MIDDLE EAST COUNTRIES[1/]

Prepared by

the Secretariat of UNIDO

1/ This document has been reproduced without formal editing.

CONTENTS

		Page
1.	Introduction	3
2.	The Food Processing Industry	4
3.	Selected Branches of the Food Industry in Some Countries of the Middle East	5
	A. Fruit and Vegetable Industry	6
	B. Sugar Industry	9
	C. Vegetable Oils, Fats and Feed Industry	12
4.	Development of the Middle East Food Industry	16
	A. Present Conditions	16
	B. Conditions for Optimizing Operational Performance	16
	C. Food Engineering Consultancy Service	17
5.	Conclusions	20

TABLES

Table 1:	Fruit and Vegetable Industry	7
Table 2:	Sugar Industry	10
Table 3:	Vegetable Oils, Fats and Feed Industry	13

1. Introduction

There is a world consensus that the availability of food products should be increased in order to up-grade nutritional standards and meet the contingency of acute shortages arising from crises due to circumstances beyond human control, i.e., freak climate conditions, earthquakes and other natural disasters. Even ignoring the aspect of periodic food supply failures, the trend in most developing countries is towards food deficits far exceeding their capacity to import on commercial terms. The gap between food demand and supply is widening and food imports are increasing. The developing countries are facing the problem of financing a very high food import bill which, combined with the consequences of the actual world economic crisis, is substantially aggravating this situation, and will certainly result in a critical world payment crisis if serious measures are not taken. Therefore, all efforts should be concentrated on expanding more rapidly, the world's food production and reducing losses by means of employing modern processing and preservation methods.

The World Food Conference recommended that:

- The first world priority for the next decade must be a substantial and sustained acceleration in the increase of food production.
- A greater proportion of the world's research should be devoted specifically to food production.
- Effort should be directed all over the world towards reducing post-harvest losses of foods, through better processing, storage and distribution.
- The agro-industries should play an important role in both the processing of agricultural products and in the provision of essential inputs.
- The integrated approach to rural development, price policies, co-operative farming, etc., should be widely used to solve the food problems.
- All countries, and primarily the highly industrialized, should promote the advancement of appropriate food production technology and make efforts to promote its transfer, adaptation and dissemination.

2. The Food Processing Industry

The food processing industry plays a fundamental and increasingly important role in the supply of food products. Food processing and agriculture are complementary and increasingly interdependent, in such a way that the identification of where one ends and the other starts, becomes more and more difficult. Not only is its tradional function of conservation and processing of surplus an important role of the food industry, but also important is its role as a tool to increase the use of the raw materials themselves and their by-products in order to make possible the use of materials which otherwise would be polluting factors.

A variety of agricultural raw materials require industrial processing before they can be consumed. A typical crop of this type are soyabeans, having reached their world-wide importance as a protein food and feed component only through appropriate industrial processing. All oilseed crops, cassava and a variety of grains fall under the same category and last, but not least, palm oil fruits need to be mentioned which have led to the establishment and rapid development of a large-scale agro-industry. The food industry from this viewpoint only, plays a vital role in the international food supply.

In addition, the food industry has another important task to fulfil, namely to upgrade industrial by-products and wastes and turn them into high value food and feed products. The fermentation industry plays a leading role in this field and also the utilization of brans, molasses, slaughterhouse wastes, fish meal and others for the production of feed components and mixed feed as the basis for increasing animal production and finally the supply of meat and other animal products.

In the last three decades, the fruit juice industries have developed at a phenomenal rate. In less than thirty-five years, the commercial output of fruit juices and concentrates increased from almost nothing to about 7,000,000 tons. Only through processing is it possible to preserve and transport such enormous amounts of juices from the production to the consumer centres.

The production of white sugar has been increasing at nearly 4 per cent compound a year from 1957 to 1972, from 40 to 70 million tons and the projected rate of increase is now about 2.7 million tons a year, which corresponds to the output of forty-five large factories, each making 60,000 tons a year.

The statistics indicate that the value added by food processing industries is more than one third as great as the value added by all agricultural production. In a typical industrialized country $100 worth of food in the retail shop will contain $50 representing the cost of processing and distribution, against $20 in agricultural inputs and $30 of value added on the farm 1/

The new avenues for the increasing of the food supply through industrialization are only just opening up. Actually, great quantities of raw materials are being wasted or not fully utilized. From the production of bananas in countries like Ecuador, about 45 per cent is annually lost. Banana is a very rich carbohydrate and if isolated could perhaps be a raw material to produce bread. The necessary research work is still to be undertaken. Enrichment of traditional foods like cassava, with protein either from other sources like soya or through its own fermentation is a very promising possibility to be explored. The petro-protein also will play an important role as animal feed. These are only a few examples of the importance of the food processing industry in the programmes of increasing the world food supplies and we should mention that the benefits from the food processing industry go far beyond calories and nutrition. Food imports can be reduced or eliminated and food products exported - a two way economic gain. The food processing stimulates greater and more efficient agricultural production. Employment is increased, not only in the factories and the fields, but also, in ancillaries to food processing.

3. Selected Branches of the Food Industry in Some Countries of the Middle East

Although not complete and also not entirely up to date, the following summary gives a general idea of the prevailing situation of

---

1/ Agricultural Adjustments in Developed Countries, FAO, ESC: 72/3 June 1972

the fruits and vegetables, sugar, vegetable oils and fats and feed industry in some Middle East countries.[2/]

A. Fruit and Vegetable Industry

As can been seen from Table 1, the fruit and vegetable industry is a very important sector of production in the Middle East countries. In most of them various factories exist and others are being planned. It is a dynamic sector which is being modernized and expanded. The great majority of the factories have diversified production lines. The plants, in general, operate below the installed capacities. This is due primarily to the shortage of raw materials and secondarily, to other problems related to unbalanced equipment and shortage of operators. Several plants were established without a strict plan and they do not have proper lay-outs or homogeneous equipment lines. The production is affected by the quality of the raw materials and their scarcity. The variation of their prices also affects the production costs.

The industry lacks assistance in terms of supporting services such as training, research and development, quality control, etc. In general, the mangement is not as modern and dynamic as it should be.

It must be pointed out that most of the industry in this sector is government owned. This factor should be considered as a favourable one in respect to the technical assistance to be given.

Another aspect which should be pointed out is the similarity of problems encountered by the industry in the various countries. This also should be considered favourable in relation to technical assistance programmes, since it would be easier to organize such services at country and regional levels.

2/ For more details see UNIDO's documents ID/WG. 201/1 to ID/WG. 201/11 of 20 December 1974.

Table 1

FRUIT AND VEGETABLE INDUSTRY

COUNTRY	NUMBER OF PLANTS				PRODUCT DIVERSIFICATION	PROBLEMS						
	Exist		Plan			RAW MATERIALS	PACKAGING	LAY-OUT	EQUIPMENT	PERSONNEL	MARKET	OTHERS
	Gov.	Priv.	Gov.	Priv.								
PEOPLES DEMOCRATIC REPUBLIC OF YEMEN			1		Tomato paste	Plant will operate only three months per year.	-				no problem	The country imports a great amount of processed fruits and vegetables.
JORDAN	1		1		Mostly tomato paste	Information		not	available		no problem	
LEBANON	9				Very diversified	- shortage - not the proper quality - high and varied prices	- expensive - not the proper quality	not adequate	- not balanced lines - not homogeneous	shortage of skilled trained operators	no problem	- Plants operating below capacity. - Lack of quality control. - Lack of research and development. - Lack of standards.
IRAQ	3		12		Very diversified	- shortage - not the proper quality - high and varied prices	- expensive - not the proper quality	not adequate	- not balanced lines - not homogeneous	shortage of skilled trained operators	no problem	- Production costs relatively high. - Lack of research and development - Operation below capacity.

Table 1
(continued)
FRUIT AND VEGETABLE INDUSTRY

COUNTRY	NUMBER OF PLANTS				PRODUCT DIVERSIFICATION	PROBLEMS						
	Exist		Plan			RAW MATERIALS	PACKAGING	LAY-OUT	EQUIPMENT	PERSONNEL	MARKET	OTHERS
	Gov.	Priv.	Gov.	Priv.								
SYRIA	5	2			very diversified	- shortage - not the proper quality - high and varied prices	- expensive - not the proper quality	not adequate	- not balanced lines - not homogeneous	shortage of skilled trained operators	no problem	- Lack of research and development. - Lack of standards. - Operation below capacity.

D. Sugar Industry

Table2 indicates the situation in three Middle East countries with regard to the sugar production. It is an important industry which is also being expanded. However, the region depends to a great degree on imports and actions should be taken to modernize,expand and integrate existing plants and to establish new ones. The existing plants in great part refine imported raw sugar. However, plans for the local production of raw materials and raw sugar should be stimulated. The existing plants present problems which should be removed by means of improving the management, creating standards of quality and enforcing them by law. The managers and operators should receive better training programmes and as a basic goal, measures should be taken to up-grade the use of the available production capacity by means ofsupplying raw materials on a more steady basis, reducing the breakdowns by means of better repair and maintenance and modernizing the equipment.

In summary, the sugar industry in the Middle East requires multidisciplinary technical assistance which should comprise of the planning of its long term expansion, preparing the necessary feasibility studies and projects, to make the agricultural developments, establishing new plants and the assessment of them in the initial phases of operations, training operators, etc.

Table 2

SUGAR INDUSTRY

COUNTRY	NUMBER OF PLANTS				PRODUCTS	PROBLEMS						
	Exist		Plan			RAW MATERIAL	MAN-AGMENT	PERSONNEL	REPAIR + MAIN-TENANCE	UTILIZ-ATION OF CAPACITY	AGRO-INDUSTRY INTEGRATION	OTHERS
	Gov.	Priv.	Gov.	Priv.								
SYRIAN ARAB REPUBLIC	3		1		- production of sugar-beet - refining imported raw sugar	The beet quality should be improved and more strict quality controls enforced.	should be up-graded espe-cially controls	shortage of skilled trained operators	should be up-graded espe-cially the preven-tive main-tenance	The plants operate below capacity due to shortage of raw materials, repair and main-tenance and ineffi-ciency of operators.	should be increased in order to better balance the agriculture production and the plant requirements	The equipment of the plants is not homogeneous
LEBANON		4			specially refining imported raw sugar (3 plants) integrated sugar-beet production (1 plant)	The local produc-tion of raw materials should be increased and its quality up-graded	should be improved espe-cially to up-grade the utiliz-ation of the produc-tion capa-city	shortage of skilled and trained personnel	should be up-graded and better planned	The poor manage-ment is responsible for the low capacity utiliz-ation.	should be increased in order to ameliorate the supply of raw material	The Covernment subsidizes the importing of raw sugar.

Table 2

SUGAR INDUSTRY
(continued)

COUNTRY	NUMBER OF PLANTS				PRODUCTS	PROBLEMS						
	Exist		Plan			RAW MATERIAL	MAN-AGMENT	PERSONNEL	REPAIR + MAIN-TENANCE	UTILIZ-ATION OF CAPACITY	AGRO-INDUSTRY INTEGRATION	OTHERS
	Gov.	Priv.	Gov.	Priv.								
SAUDI ARABIA			1		Initially refining, later producing raw sugar. The plant will cover the country's needs.							

C. Vegetable Oils, Fats and Food Industry

This sector also is very important and in great expansion. Most of the plants are of governmental property and the same is true concerning the factories being established or planned. The great majority of the plants operate below their installed capacities and the main reason is the shortage of raw materials. The supply of other inputs such as packaging materials, water and electricity also affects the plant's operations. The industry is very diversified, both with respect to the products and to the type of structure. However, the most important product with respect to quantity is oil from cotton seeds. With regard to the type of plant structure, most of the plants produce and refine oils, generally from imported seeds. However, there are factories which only refine crude oil that is imported. The industry lacks the basic requirements for producing standard quality products. The level of training of the operators is, in general, low. The facilities for performing quality control are inadequate and the raw materials frequently are not of homogeneous quality. Therefore, the industry needs supporting technical assistance aimed at up-grading the overall operations and quality of products. The industry needs to be expanded and modernized. The type of integrated plants should be encouraged since the local production of the required raw materials has been proven to be feasible. Table 3 is a summary of the main aspects of this industrial sector.

Table 3

VEGETABLE OILS, FATS AND FEED INDUSTRY

COUNTRY	NUMBER OF PLANTS				PRODUCTS	PROBLEMS						
	Exist		Plan			RAW MATERIAL	OTHER INPUTS	PERSONNEL	QUALITY	UTILIZATION OF CAPACITY	QUALITY CONTROL	OTHERS
	Cov.	Priv.	Gov.	Priv.								
LEBANON		12			- olive oil, traditional - oils from oil seeds with the use of modern and more sophisticated method - production very diversified with about seven different basic raw materials	- mostly imported - prices and quality vary	- packaging materials, water and electricity - supply should be improved	There is an urgent need of training to improve the overall level of skill of the employees.	Is not of the high standard that it should be.	The plant works below level, due to the shortage of raw materials.	Not as good and homogeneous as it should be.	- The plants do not have proper technical assistance to operate with efficiency. - There is a lack of scientific knowledge.
JORDAN	No information is available				A small quantity of olive oil is produced in the country.	No information available.						

Table 3

VEGETABLE OILS, FATS AND FEED INDUSTRY
(continued)

COUNTRY	NUMBER OF PLANTS				PRODUCTS	PROBLEMS						
	Exist		Plan			RAW MATERIAL	OTHER INPUTS	PERSONNEL	QUALITY	UTILIZATION OF CAPACITY	QUALITY CONTROL	OTHERS
	Gov.	Priv.	Gov.	Priv.								
SYRIAN ARAB REPUBLIC	7		3		- Most important is from cotton seeds, others are from sesame and sunflower - There are a great number of small factories producing olive oil.	The supply of raw materials is improving although not yet sufficient Storage of raw materials is not adequate.	Packaging and chemicals are imported and their prices are comparatively high.	There is an urgent need of training to improve the overall level of skill of the employees.	There is an urgent need to up-grade quality.	The plants operate below capacity due to the existence of much old equipment requiring more than normal maintenance services. There is frequent shortage of raw materials.	There is an urgent need to establish quality control services.	The management the plants mus be modernized. The expansion the industry wi require a more integrated bas
SAUDI ARABIA			1			The plant will use sunflower seeds which will grow in the south of the country.						

Table 3

VEGETABLE OILS, FATS AND FEED INDUSTRY
(continued)

COUNTRY	NUMBER OF PLANTS				PRODUCTS	PROBLEMS						
	Exist		Plan			R'W MATERIAL	OTHER INPUTS	PERSONNEL	QUALITY	UTILIZ-ATION OF CAPACITY	QUALITY CONTROL	OTHERS
	Gov.	Priv.	Gov.	Priv.								
IRAQ	4		1		- are from cotton, sesame, sunflower, linseed and saflower - most of the raw material used is imported crude oil	- supply of raw materia, is a great problem There ere shortages and prices and quality variations.	packaging, water and electricity should be improved	There is an urgent need of training facilities	not satisfactory and not homogeneous	Less than 50% of the capacity is used mostly due to shortage of raw materials.	There is a need to improve and to establish more efficient laboratories	There is a great deficiency in research and development and of technical assistance services.

4. Development of the Middle East Food Industry

A. Present Conditions

In the last section of this paper, the main problems affecting the selected branches of the food industry in various countries were mentioned. There is a great similarity in the performance of the plants. Most of them are working below the installed capacity and, the factors determining the below standard efficiency are also very similiar. The most important and most frequent cause is the shortage and inadequate supply of raw materials. To this essential factor others are added which have a varied degree of influence and they are related to the training of operators, imbalance of equipment lines, supply of secondary materials, repair and maintenance, etc. The industry in all the countries is going through a process of expansion and also in all of the countries the local supply of foods is not sufficient to satisfy the consumption requirements either in terms of the quantity or the quality of the products. Therefore, the industry urgently requires a comprehensive plan of technical assistance aimed at creating the conditions to optimize the utilization of the available capacity of production and to promote the expansion of the industry according to modern techniques and on an integrated basis.

B. Conditions for Optimizing Operational Performance

Experience shows that a food processing industry, to be successful, must, to the fullest extent possible, be an integrated system of processing agricultural raw materials into final products. Experience has shown also, that the successful implementation of integrated projects requires a multi-disciplinary approach, involving market surveys, feasibility studies, and techno-economic appraisals as well as operational technical assistance and training facilities. There is no doubt that the successful implementation of projects for modernizing and expanding existing industries and for the establishment of new ones is possible only if it is performed sequentially by the same organization. Historically, attempts to divide the responsibility among various organizations or to spread them over extended periods of time have resulted in consistent failure to accomplish actual implementation of the plans. For this reason it is recommended

that national centres for the food industry development be established. Such centres would give to the industry, on a continuous basis, the multi-disciplinary assistance as mentioned above. Such centres would be called Food Engineering Consultancy Services and, the following should be their main characteristics:

C. Food Engineering Consultancy Service

(1) General

National Industrial Consultancy Services, organized by UNIDO, would be established in Middle East countries according to the country's requirements and priorities in respect to implementation of national development plans. The National Industrial Consultancy Service would use local institutes for applied research and development. International experts would be recruited to supplement the local staff of the N.I.C.S. In order to avoid duplication and to ensure optimum utilization of local experts and institutes on a regional basis, the National Industrial Consultancy Services would co-ordinate their work through Regional Industrial Consultancy Services established under UNIDO's guidance. A regional service, enjoying the co-operation and support of local, national centres, could synthesize the activities contributing towards the independent development of domestic skills in the food processing sectors. By providing expertise in food processing and packaging, elaboration of feasibility studies and detailed projects for new and reconstructed food industries, the repair and maintenance of food processing equipment, as well as sanitation materials and processes, including environmental issues such as water treatment and effluent control, the regional and national Consultancy Services could ensure the close co-operation of the production, research, processing and marketing aspects of national food industries at a vital stage in regional development.

UNIDO would, to the maximum extent possible, use National Industrial Consultancy Services to assist in the implementation of technical assistance projects in the food processing industry

(2) Objectives

Long-range objectives

The project's long-range objectives would be to promote the establishment of local food processing industries to raise and maintain the high standard of quality of their products and to increase the production of processed products. The service would provide public and private industries with marketing data as well as technical and economic information required for the establishment of factories. Furthermore, it would establish standards and provide the industries with advice and assistance in exercising control over the quality of their products.

Yet another long-term objective is the establishment of a team of local engineers and economists capable of completing pre-feasibility and feasibility studies for local industries. Hence, systematic on-the-job training of local counterparts through the international experts recruited for the shake-down period will be most essential. A number of fellowships would thus be required.

Immediate Objectives

The immediate objectives of this project would be as follows:

(a) To identify industrial investment opportunities;

(b) To formulate industrial projects;

(c) To prepare market studies for potential processed products for export;

(d) To prepare technical and economic feasibility studies for the establishment of factories in the country;

(e) To provide technical consultancy services;

(f) To promote investment in factories to produce processed products for export and provide potential investors with information on investment regulations;

(g) To transfer the results of the Food Engineering Consultancy Service's research results to industry;

(h) To organize the use of the Institute's Service facilities for food quality control and product development research by the industrial community;

(i) To advise food industry on up-to-date management and technological problems;

(j) To assist food industry to raise efficiency and quality to required standards;

(k) To assist food industries to achieve a food international level.

(3) Work Plan

General

The Centre would be created by UNDP and the Government either as an attachment to existing food research centres or as an independent body; however, it is up to be a semi-public body, financed to the greater part by the private industries, to whom it provides its services. This will ensure that the service concentrates its activities directly upon assisting the local industries in their development.

The service would be organized in two departments, both of which have a Department Chief. The Department Chiefs will report to the Director who, in turn, will be responsible to the Board of Directors. The two Departments will be:

Economic Department with the programme of:

- Market research including marketing and distribution techniques;
- Collection and analysis of market statistics;
- Establishment of contacts with various industries;
- Export promotion policies;
- Maintenance of liaison with national industry associations;
- Preparation of economic feasibility studies;
- Documentation on all economic aspects of local industries;
- Staff training in economics and financing;
- Book-keeping and accountancy services;
- Financial programming services.

Technology department with the programme of:

- Processing and product development;
- Technical consultancy services including the evaluation of offers and assistance in the maintenance of equipment, etc.;
- Technical feasibility studies;
- Staff training;
- Transfer of technology;
- Laboratory services for quality control, etc.;
- Standardization;
- Production programming;
- Plant-level assistance;
- Packaging of food products;
- Technical management;
- Training the staff of food industry clients;
- Repair and maintenance of control instruments for food industry;
- Sanitation techniques;
- Plant installation and operation service.

5. Conclusions

The previous chapters of this paper contain a series of facts and considerations of a preliminary nature which indicate that the Middle East Countries have the basic conditions to enable them to contribute towards the targets of increasing food production as recommended by the World Food Conference. It was shown that the food processing industry is a dynamic sector in most of the countries, and it was also shown that there is a great potential for increasing the use of the available processing capacity and to expand it. The production of agricultural raw materials, which proved to be feasible in most of the countries is being expanded in order to solve the industry's actual basic problem.

There is an urgent need to assist the industry to ameliorate its efficiency in using the equipment and producing better quality products. It was shown that the problems facing the industry are very similar in all the countries. Therefore, it is clearly indicated that a systematic approach towards the industry's modernization and expansion is required and that co-operation between the

various countries is possible and desirable, since it would contribute to a better use of scarce resources for planning, training, performing research and development work, etc. It was indicated that a multi-disciplinary approach of technical assistance to be supplied by Engineering Consultancy Services, would be the most adequate way of rationaly promoting the food industry development and that the National Consultancy Services should co-ordinate at regional level. It must be pointed out that a project to establish in Iraq, a Centre for the Food Processing Industry Development, is under implementation. The structure and objectives of this Centre follow entirely along the lines recommended in this paper. Therefore, we recommend that the possibility be explored of having this Centre as a model for others to be established in other countries and also, if possible, to expand the Iraq's Centre's structure and activities as to make it a regional nucleus of technical assistance in the field of the food processing industry.